Innovative Pedestrian Treatments

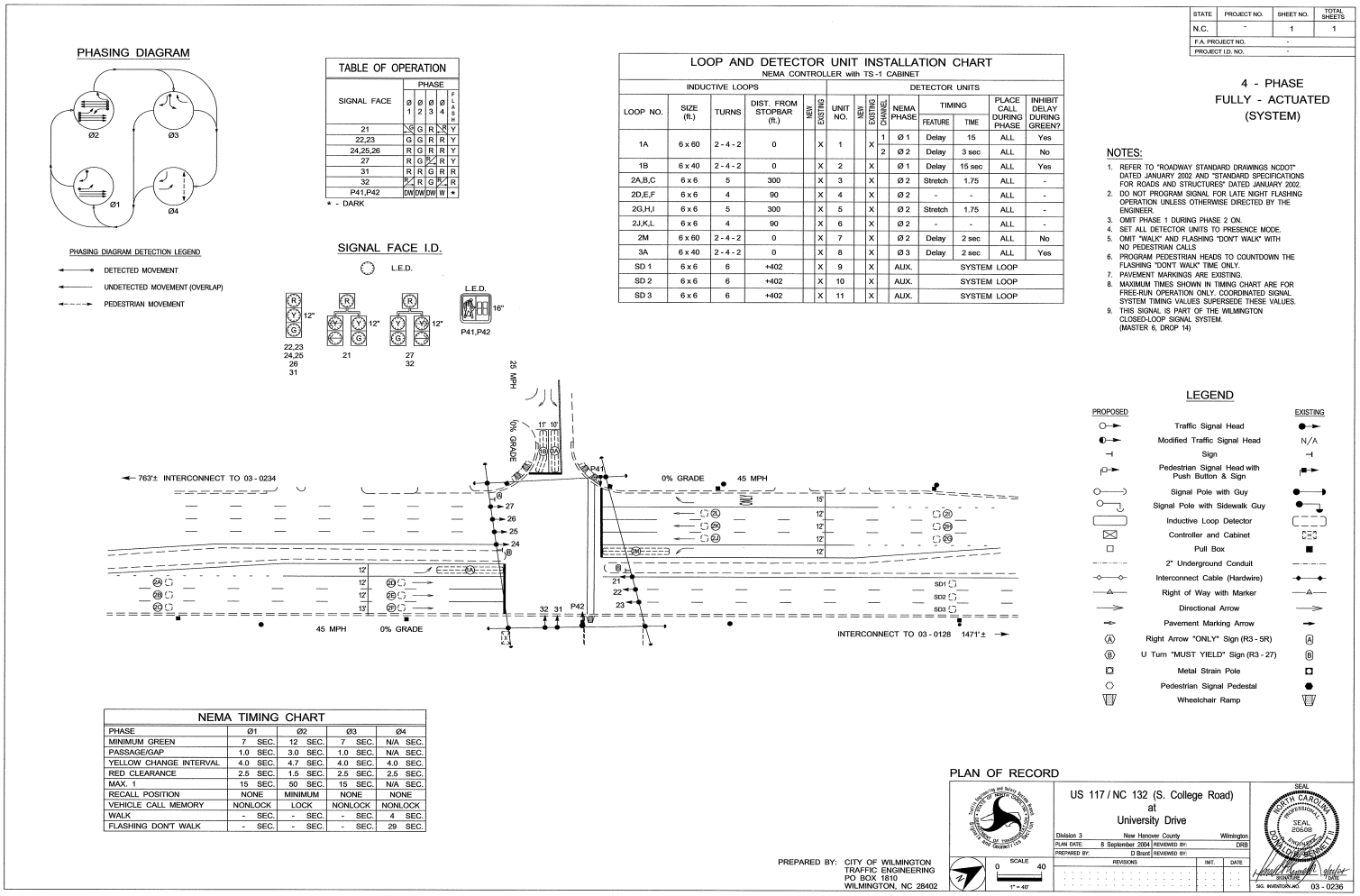
T Intersection with moderate pedestrian volumes

Don Bennett, PE
Wilmington City Traffic Engineer

Statement of issues

- T intersection in the middle of 6 lane divided arterial
- College Student crossing point from apartments to campus
- Jaywalking
- Disruption of progressive band
- Pedestrians sequential to side street phase

Existing Plan



PHASING DIAGRAM

Ø2 Ø3 Ø1 Ø4

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1	Ø2	Ø3	Ø4	FLASH
21	G	R	R	R	Y
22,23	G	R	R	R	Y
24,25,26	R	G	R	R	Y
27	R	G	R	R	Y
31	R	R	G	R	R
32	R	R	G	R	R
P41,P42	DW	DW	DW	W	*

* - DARK

SIGNAL FACE I.D.

L.E.D.

22,23 24,25 26 31 — 21 — 27 32 — P41,P42 (L.E.D.)

LOOP AND DETECTOR UNIT INSTALLATION CHART
NEMA CONTROLLER with TS-1 CABINET

INDUCTIVE LOOPS: LOOP NO.	SIZE (ft.)	TURNS	DIST. FROM STOPBAR (ft.)	NEW	EXISTING	DETECTOR UNITS: UNIT NO.	NEW	EXISTING	CHANNEL	NEMA PHASE	TIMING: FEATURE	TIME	PLACE CALL DURING PHASE	INHIBIT DELAY DURING GREEN?
1A	6 x 60	2 - 4 - 2	0		X	1		X	1	Ø 1	Delay	15	ALL	Yes
									2	Ø 2	Delay	3 sec	ALL	No
1B	6 x 40	2 - 4 - 2	0		X	2		X		Ø 1	Delay	15 sec	ALL	Yes
2A,B,C	6 x 6	5	300		X	3		X		Ø 2	Stretch	1.75	ALL	-
2D,E,F	6 x 6	4	90		X	4		X		Ø 2	-	-	ALL	-
2G,H,I	6 x 6	5	300		X	5		X		Ø 2	Stretch	1.75	ALL	-
2J,K,L	6 x 6	4	90		X	6		X		Ø 2	-	-	ALL	-
2M	6 x 60	2 - 4 - 2	0		X	7		X		Ø 2	Delay	2 sec	ALL	No
3A	6 x 40	2 - 4 - 2	0		X	8		X		Ø 3	Delay	2 sec	ALL	Yes
SD 1	6 x 6	6	+402		X	9		X		AUX.	SYSTEM LOOP			
SD 2	6 x 6	6	+402		X	10		X		AUX.	SYSTEM LOOP			
SD 3	6 x 6	6	+402		X	11		X		AUX.	SYSTEM LOOP			

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	-	1	1
F.A. PROJECT NO.	-		
PROJECT I.D. NO.	-		

4 - PHASE
FULLY - ACTUATED
(SYSTEM)

NOTES:

1. REFER TO "ROADWAY STANDARD DRAWINGS NCDOT" DATED JANUARY 2002 AND "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2002.
2. DO NOT PROGRAM SIGNAL FOR LATE NIGHT FLASHING OPERATION UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. OMIT PHASE 1 DURING PHASE 2 ON.
4. SET ALL DETECTOR UNITS TO PRESENCE MODE.
5. OMIT "WALK" AND FLASHING "DON'T WALK" WITH NO PEDESTRIAN CALLS
6. PROGRAM PEDESTRIAN HEADS TO COUNTDOWN THE FLASHING "DON'T WALK" TIME ONLY.
7. PAVEMENT MARKINGS ARE EXISTING.
8. MAXIMUM TIMES SHOWN IN TIMING CHART ARE FOR FREE-RUN OPERATION ONLY. COORDINATED SIGNAL SYSTEM TIMING VALUES SUPERSEDE THESE VALUES.
9. THIS SIGNAL IS PART OF THE WILMINGTON CLOSED-LOOP SIGNAL SYSTEM. (MASTER 6, DROP 14)

763'± INTERCONNECT TO 03 - 0234

25 MPH

10% GRADE

0% GRADE 45 MPH

45 MPH 0% GRADE

INTERCONNECT TO 03 - 0128 1471'±

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Traffic Signal Head	N/A
	Sign	
	Pedestrian Signal Head with Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller and Cabinet	
	Pull Box	
	2" Underground Conduit	
	Interconnect Cable (Hardwire)	
	Right of Way with Marker	
	Directional Arrow	
	Pavement Marking Arrow	
(A)	Right Arrow "ONLY" Sign (R3 - 5R)	(A)
(B)	U Turn "MUST YIELD" Sign (R3 - 27)	(B)
	Metal Strain Pole	
	Pedestrian Signal Pedestal	
	Wheelchair Ramp	

NEMA TIMING CHART

PHASE	Ø1	Ø2	Ø3	Ø4
MINIMUM GREEN	7 SEC.	12 SEC.	7 SEC.	N/A SEC.
PASSAGE/GAP	1.0 SEC.	3.0 SEC.	1.0 SEC.	N/A SEC.
YELLOW CHANGE INTERVAL	4.0 SEC.	4.7 SEC.	4.0 SEC.	4.0 SEC.
RED CLEARANCE	2.5 SEC.	1.5 SEC.	2.5 SEC.	2.5 SEC.
MAX. 1	15 SEC.	50 SEC.	15 SEC.	N/A SEC.
RECALL POSITION	NONE	MINIMUM	NONE	NONE
VEHICLE CALL MEMORY	NONLOCK	LOCK	NONLOCK	NONLOCK
WALK	- SEC.	- SEC.	- SEC.	4 SEC.
FLASHING DONT WALK	- SEC.	- SEC.	- SEC.	29 SEC.

PLAN OF RECORD

PREPARED BY: CITY OF WILMINGTON
TRAFFIC ENGINEERING
PO BOX 1810
WILMINGTON, NC 28402

US 117 / NC 132 (S. College Road)
at
University Drive

Division 3 | New Hanover County | Wilmington
PLAN DATE: 8 September 2004 | REVIEWED BY: DRB
PREPARED BY: D Brent | REVIEWED BY:

REVISIONS	INIT.	DATE

SCALE 0 40 1" = 40'

SEAL 20608 — NORTH CAROLINA — REGISTERED — PROFESSIONAL ENGINEER

SIGNATURE DATE

SIG. 03 - 0236

Problem

- Single ring controller running intersection with multiple confusing overlaps
- Long pedestrian intervals interfere with progression leading to driver frustration, dramatically affects downstream over capacity signal
- No funds to construct pedestrian refuge, or reconfigure intersection
- No flexibility in serving pedestrians concurrent with vehicles
- Motorist complaints that controller is hung up in side street movement

Field Observations

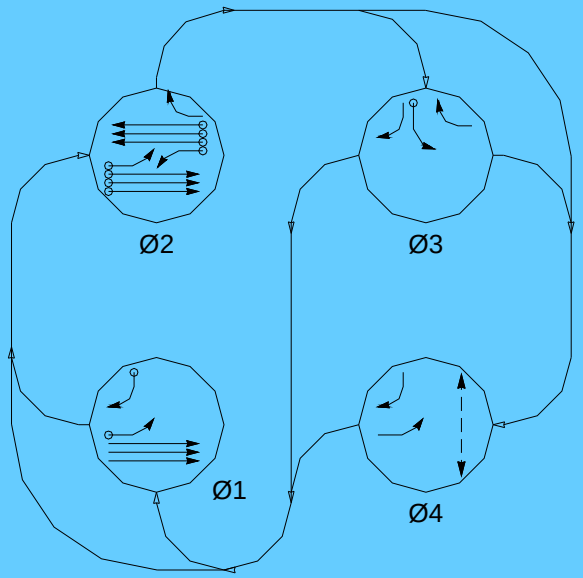
- Numerous pedestrians utilize gaps created by platooning to make two-stage crossing during arterial green.
- Others start crossing with side street green and have cleared the intersection before onset of pedestrian phase
- Very few wait for WALK signal, resulting in motorist complaint of pedestrian movement running without pedestrians present.
- Engineer "It's running the pedestrian movement" Caller "They're halfway to class already, I don't understand why I'm stopped"

Concerns

- It's been this way for a long time, will they accept the change?
- Why were the pedestrians split out in the first place?
- Is this signal even warranted without the pedestrians?
- Will motorists understand the concurrent pedestrians and yield?

Existing and proposed phasing

PHASING DIAGRAM



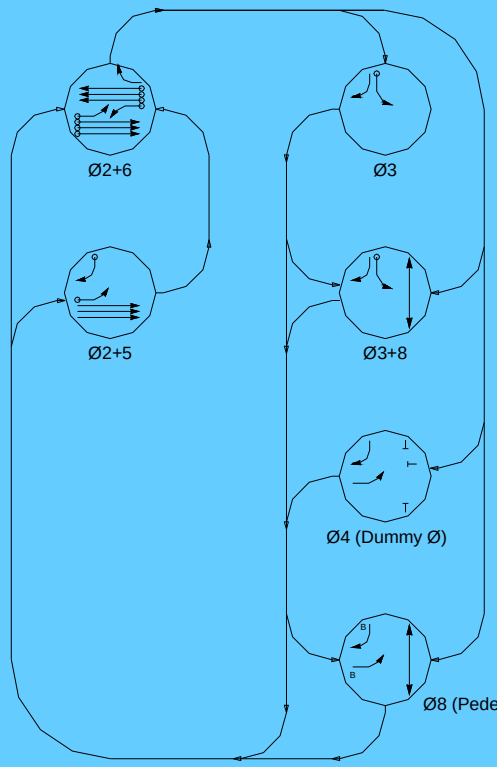
PHASING DIAGRAM DETECTION LEGEND

DETECTED MOVEMENT

UNDETECTED MOVEMENT (OVERLAP)

PEDESTRIAN MOVEMENT

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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PEDESTRIAN MOVEMENT

Benefits of proposed phasing

- Controller can service both the side street pedestrians concurrently with the side street vehicular phase
- Main street left turn can be initiated at the end of the side street vehicular demand and time concurrently with remainder of long pedestrian timing
- If sufficient time remains on peds, main street left turns can be serviced returning to two way main street green earlier
- Concurrent pedestrian movement meets pedestrian expectations

More benefits

- Cabinet gets replaced, this one is particularly old
- Phasing retains general concept with added flexibility
- Can result in better progression since there is an increased probability of "early return to green.
- Better understanding by motorists on main street

Questions?